DOCUMENT RESUME

ED 066 174 LI 003 806

AUTHOR	Dewhirst, H. Dudley
TITLE	The Role of the LRC Technical Library in Fulfilling the Information Needs of Professional Employees.
SPONS AGENCY	National Aeronautics and Space Administration-American Society for Engineering Education Summer Inst., Langley Station, Va.
PUB DATE	Aug 70
NOTE	86p.; (32 References); Study done at Langley Research Center, Hampton, Va.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Critical Incidents Method; *Evaluation; *Evaluation Techniques; *Information Sources; Library Collections; Library Facilities; *Library Services; Questionnaires; *Research Libraries; Use Studies
IDENTIFIERS	*Langley Research Center; Library Role; Scientific and Technical Information

ABSTRACT

This library evaluation is based primarily on responses of some 320 members of the professional research staff and 50 members of the professional administrative staff at the Langley Research Center to a questionnaire. Evaluation first considers the library as a whole as only one part of a total system of information sources serving professionals. This is followed by an evaluation of the collection, facilities and tools, and services of the library based on responses of those who use the library more than six times a year. A major feature of the evaluation is the use of a critical incident technique in which respondents furnish details of a recent incident when they located information which proved useful in their work. The role of the library is then inferred from comparison of information source utilization using a previous study as a standard. The analysis of the library collection, tools and facilities, and services provides the basis for more detailed evaluation and recommendations. (Author/SJ)

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THE ROLE OF THE LRC TECHNICAL LIBRARY IN FULFILLING THE INFORMATION NEEDS OF PROFESSIONAL EMPLOYEES,

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Prepared under a fellowship granted
as part of the 1970 NASA-ASEE Summer Institute

Langley Research Center

August 1970

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This library evaluation is based primarily on responses of some 320 members of the professional research staff and 50 members of the professional administrative staff to a questionnaire. Evaluation first considers the library as a whole as only one part of a total system of information sources serving professionals. This is followed by an evaluation of the collection, facilities and tools, and services of the library based on responses of those who use the library more than six times a year.

A major feature of the evaluation is the use of a critical incident technique in which respondents furnish details of a recent incident when they located information which proved useful in their work. The detailed methodology closely follows that used by Rosenbloom and Wolek[1] in a major study of information sources used by scientists and engineers in four large corporations. The role of the library is then inferred from comparison of information source utilization using the previous study as a standard.

The analysis of the library collection, tools and facilities, and services provides the basis for more detailed evaluation and recommendations.

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[1]Rosenbloom, Richard S., and Wolek, Francis W.: Technology, Information and Organization. Boston: Harvard Graduate School of Business Administration, 1967.

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INTRODUCTION

This report is the result of a 10-week research project conducted as part of the 1970 ASEE-NASA Summer Institute. The project was an evaluation from the user's point of view of the LRC Technical Library. The primary sources of information for the evaluation were two sets of questionnaires. The first questionnaire was directed to members of the professional research staff in the research divisions, engineering and technical service divisions, and project offices. The second questionnaire was sent to a smaller group of professional-level personnel in administrative divisions.

The responses to these questionnaires, supplemented by information furnished by the library staff and the observations by the author provide the basis for the evaluation.

Section I is a brief discussion of what has been called the "information explosion" and the library's response to a dramatic increase in the size and scope of its collection.

This is followed by a discussion of methodology in Section II which explores the difficult problem of library evaluation, explains the strengths and weaknesses of the approaches used. This portion of the report provides a description of sampling technique and a profile of the respondents.

Section III reviews the role of the library as part of the total system of information sources available to users. Reported usage as well as importance rankings of the library and other information sources are compared. In addition, data on information source utilization from Langley engineers and scientists are compared with similar data obtained in Technology, Information and Organization, a major study by Richard Rosenbloom and Francis Wolek.

Section IV reports and analyzes the responses of users of the library to questions pertaining to the collection, the services offered, and the tools and facilities offered by the library.

Section V presents the conclusions reached, makes recommendations, and presents several questions about the long-term policy with respect to information services provided by Langley for its professionals.

The author would like to acknowledge the generous help of the entire library staff, without which this report would not be possible. In particular, my thanks go to Phil Weatherwax, Jane Hess, and Willaree Curtis for answering innumerable questions about library operations; to Betty Gilman for her help in literature searching; to Dilsey Hawthorne for her aid in coding and keypunching data from the questionnaires; to Marshal Hughes II for his programing and begging of computer time; and to Oneda Moore for exceptionally quick service in typing drafts of this report.

SECTION I

THE DATA EXPLOSION: IMPACT AT LANGLEY

"Data are the very latest kind of pollution." Stafford Beer

The task of the LRC Technical Library and, in fact, every scientific or technical library has been made more difficult because of dramatic increase in the amount of material published. Kosmetsky suggests the magnitude of the explosion in the following:

> Let me try to relate the data explosion to the mount of reading one would have to do weekly in order to keep current with technology thrcugh published works. In 1900 the weekly stack of published material would be 5 feet high, 1 foot wide, and 1 foot long. In 1960 the stack would be 5 feet high, 1 foot wide, and 60 feet long. Predictions have shown that by the year 2000, the stack will be 5 feet high, 15 feet wide, and 60 feet long. (Kosmetsky, 1970, p. 105.)

While Kosmetsky's demonstration spans a long time period, it amounts to an approximate doubling of data every 10 years. While such a growth rate is dramatic in itself, it does not equal the rate at which the total collection at the LRC Technical Library has grown in the last decade.

Table I-1 indicates the approximate size of the collection at Langley for the years 1960, 1965, and 1970. The data are estimates since data have not been kept in this form in the past.

It can be seen that growth has been dramatic in all areas. Over the last decade the report collection has increased by 167 percent, the periodical collection by 147 percent, and the book collection by nearly 200 percent.

TABLE I-1.- SIZE OF COLLECTIONS IN THOUSANDS 1960-1970

Collection	Year		
	1960	1965	1970
Reports:			
Paper copy available locally	120	100	120
Paper copy - other NASA Centers	30	---	---
Microfiche (excluding locally available paper duplicates)	0	100	180
Machine indexed (not available locally)	0	20	100
Total reports	150	220	400
Periodical articles:			
Bound periodicals[1]	300	360	660
Microfiche (excluding locally available paper duplicates)	0	5	40
Machine indexed (not available locally)	0	20	40
Total periodical articles	300	385	740
Books:	13	24	38

[1]Article content of bound periodicals estimated at 60 articles per bound volume.

Examination of table I-1 demonstrates changes in the nature of the collection as well as growth in all portions of the collection. In the reports sector, all of the growth has occurred in two new forms of data storage, namely, microfiche and access to data stored at a centralized information center located at College Park, Maryland.

With the establishment of the centralized facility at College Park, Maryland, the cataloging of documents was substantially eliminated at

Langley. The College Park facility performs abstracting and cataloging for the entire NASA system. A key feature of this centralized system is a computerized information retrieval system which serves two basic functions. First, master index tapes are provided to major participating libraries. These tapes can be used to provide an index by report number, author, and subject. Secondly, participating libraries can, through use of a remote console (RECON), search the entire stored data collection by using a system of key words to find reports on a particular subject.

By curtailing its cataloging function, utilizing microfiche (also provided by the College Park facility), and using indices prepared from master tapes provided by the facility, the LRC library has managed to keep up with the data explosion and serve a greater number of patrons with a workforce smaller than that of 10 years ago. These data are shown in table I-2.

TABLE I-2.- GROWTH IN CIRCULATION PATRONS AND STAFF, 1960-1970

	1960	1970	Percent increase (decrease)
Patrons*	1,100	1,600	45
Monthly circulation	2,500	5,300	110
Staff	26	22	(15)

*Approximate size of professional staff (includes all employees in classification 700 - Aero-Space Technologist).

In addition to its sharp growth, the pattern of circulation has changed. Since 1964 the proportion of circulation attributable to reports has dropped

from 77 percent to 56 percent; book circulation has remained about the same at 10 to 11 percent; periodical circulation has increased from 13 percent to 33 percent. The changes in the size and nature of the collection, changes in library functions, and changes in the tools and techniques used have made the LRC Technical Library a different library from the one that went under the same name 10 years ago.

SECTION II

AN APPROACH TO THE PROBLEM OF EVALUATION

"Any evaluation must incorporate feedback from the user." F. L. Scheffler

The evaluation of any library is a difficult task for numerous reasons. There are several approaches, none of which is completely satisfactory. The present study uses a combination of several approaches with emphasis on the user's viewpoint.

Briefly summarized, approaches to library evaluation fall into one of several types as follows:

A. Economic - Costs are compared to those of other libraries either on a total or unit cost basis to determine how efficiently the library carries out its function.

In many cases, in conjunction with the cost study, an attempt is made to estimate the value of the library to the user. The problem with this approach is that "the value of information and its impact on the ultimate research performed almost defy mensuration" (Scheffler and March, 1970, p. 3). Since costs by themselves (i.e., without the resulting benefits) are not a meaningful criteria of performance for the library's function - the providing of useful information - this approach was not used to any significant degree in this study.

B. Observation and Analysis of Operations - This method relies on judgments formed by observing operations and analysis of statistical data such as circulation. This evaluation utilizes this approach to a limited degree.

C. User Survey - This method is based on the premise that service to the patron is the most important criteria on which to judge a library. It assumes that users, collectively, are reasonably good judges of the value of a library. This report is based primarily on a survey of users. A questionnaire approach was used in order to obtain a sufficiently large sample in a limited time period.

There are different types of questions which can be asked of library patrons. One type of question is the opinion question (e.g., Is the library adequately fulfilling your needs?) One major problem with this approach is that some respondents perceive ulterior motives for the question and respond accordingly. Some may feel library personnel will "catch it" if they respond unfavorably, while others may feel the library's budget will be cut if the evaluation is too glowing. Some respondents will furnish the answers they think the researcher wants, with little regard for their validity. In any event, the results are likely to be biased, and determining the direction and magnitude of the bias is not an easy task. Because of these difficulties, this survey makes only minor use of opinion-type questions.

Another approach is to ask users how they behave. While this approach is not completely free from possible bias, it substantially reduces it. For this reason, most of the questions used in this survey ask about behavior rather than opinion. Most are specific, although there are several open-end-type questions. Use is made of a "critical incident" technique which asks the respondent to recall and give details of a recent instance in which he found information useful in his work.

This technique has received favorable omment from a number of researchers in the information use field (Menzel, 1966, p. 41).

Review of Past Library Evaluations

A review of library evaluations made by various researchers indicates some of the factors which must receive some consideration in any evaluation.

First, a library is only part of a very complex system used by scientists and engineers to satisfy their information needs. Any evaluation of a library must, therefore, consider the total set of information sources (Paisley, 1968, p. 3).

Secondly, it is not valid to suggest that all individuals should use the library to the same degree. It has been shown that engineers and scientists utilize the various information sources to a greater or lesser degree, depending on whether they are working on research tasks or a development/design-type tasks (Rosenbloom and Wolek, 1966). These authors suggest that the differences in task requirements cause a different set of information needs which can best be satisfied by using a different mix of information sources.

Further substantiating the idea that not everyone should use the library, it has been demonstrated by Allen (1969) that there exist individuals within organizations who aid the flow of valuable information. These "technological gatekeepers" are (1) better acquainted with the scientific and technological literature and (2) maintain a greater degree of informal contact with peers outside their organizations. These individuals occupy key positions in the communication network in the organization. They serve as consultants and information sources for others in their work groups.

Such a naturally occurring system may be the most economical means of keeping groups of individuals well informed about activities in their particular field of research. There is, in effect, a two-step communication process in which the gatekeeper spends his time in the library, thus reducing the need for others to do so.

The above discussion indicates some of the reasons why the amount of usage of a library is an imperfect criteria for its evaluation. In addition to the difficulty of determining a standard for the "right amount" of utilization, there is also the problem of cause. For example, if a library is determined to be under-utilized, then is the fault in (a) the facilities for making the collection available to the user, (b) the collection itself, or (3) the potential user?

In spite of these difficulties, utilization of the library is used as a primary criterion in the evaluation. Several steps were taken to control or alleviate the problems discussed above. First of all, it is assumed that engineers and scientists approach the task of gathering information in a sensible manner. It has been shown by Allen (1969) that use of an information source by engineers and scientists is a function of (1) the perceived accessibility of the source and (2) the perceived technical quality of the source. Therefore, it is possible to <u>infer</u> from high volume of usage of an information source that the particular source is accessible and of good technical quality.

Fortunately, there are several studies of excellent quality which can be used as a reference point for evaluation. One in particular, <u>Technology, Information and Organization</u>, by Richard S. Rosenbloom and Francis Wolek,

explored the utilization of various information channels by over 1,500 scientists and engineers in four large corporations. Some 650 members of that sample are employed in central research divisions of their organizations and provide a group comparable to LRC research professionals. These researchers explored differences in information source utilization as a function of academic discipline (scientist versus engineer), amount of education (bachelors versus advanced degree), length of service, type of organization (central research laboratory versus operating division), and type of task (research versus development/design).

This study at Langley Research Center utilized several of the same questions used in the Rosenbloom and Wolek report.[1] Thus, it is possible to compare information source utilization of LRC professionals with that of a large number of corporate engineers and scientists. Since all of these corporations have fairly extensive libraries, it is possible to compare the libraries by comparing the utilization of various information sources. The data developed by Rosenbloom and Wolek serve as a standard for information source utilization.

Differences in background, type organization, and work task are controlled by comparing data from groups of LRC professionals with data from groups in the Rosenbloom and Wolek report of similar background, type organization, and work task.

In addition to evaluating the library as part of a complex information system, this report also examines the respondents' usage of particular

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[1]With the much appreciated permission of Dr. Richard S. Rosenbloom of the Harvard Graduate School of Business Administration.

portions of the library collections, use of help from the library staff, and use of library tools and services. Only respondents indicating a certain minimum amount of usage (more than six times for the last 12 months) were asked to respond to the questions pertaining to details of library usage. Inferences are drawn from responses to these questions about the accessibility and usefulness of the various library collections, services, and tools.

Up to this point, our discussion has centered on the use of the library by the research staff - professional-level engineers and scientists. However, in the past several years, the library has attempted to broaden its usefulness by expanding its collection in the management area. For this reason a second, shorter questionnaire was directed to a sample of professional-level personnel in the administrative divisions.

The Questionnaires and Respondent Background

A questionnaire consisting of 35 questions was designed for engineers and scientists engaged in research tasks at Langley. This questionnaire is presented in appendix A.

The population selected for sampling included all 700 classification (Aero-Space Technologists) employees who met the following criteria:

1. Had a minimum of 6 months' employment with NASA at Langley Research Center.

2. Had obtained a bachelor's degree or more in science, engineering, or mathematics.

3. Were a member of a research division, an engineering and technical service division, or a project office. (Hereafter, this group will be

referred to as the Professional Research Staff, even though it includes some members not in research divisions.)

A total of 458 members of this population was selected at random to receive questionnaires. Of these, eight were returned as undeliverable because of educational or sick leave, reducing the effective distribution to 450. Of these, 340 (or 76 percent) of those questionnaires actually delivered were completed and returned. Approximately 20 of these, however, were excluded from the analysis because they were returned too late. A summary of selected background characteristics of the respondents is presented in table II-1.

A second questionnaire containing 18 questions was designed for professional-level administrative personnel. The population selected for sampling included all 600 classification employees who met the following criteria:

1. Had a minimum of 6 months' employment with NASA at Langley Research Center.

2. Were a member of one of the divisions under the Assistant Director for Administration.

3. Not assigned to the library or to the staff of the Assistant Director.

A total of 75 questionnaires were distributed at random. Of these, 50 (or 67 percent) were returned; 49 were usable and are included in the data presented.

A summary of background characteristics of the respondents is presented in table II-1.

TABLE II-1.- BACKGROUND CHARACTERISTICS OF RESPONDENTS

Characteristic	Research staff N = 319	Administrative staff N = 49
	Percent	
Age		
20 - 24	6	2
25 - 29	18	8
30 - 34	24	14
35 - 39	14	16
40 - 49	29	25
50+	9	35
	100	100
Length of service		
0 - 2 years	3	6
3 - 5 years	14	14
6 - 10 years	35	37
11 - 15 years	19	10
15 - 20 years	8	6
20+ years	21	27
	100	100
Education		
High school	0	42
Bachelor	66	48
Master	29	8
Ph.D.	5	2
	100	100
Academic discipline		
Science/mathematics	32	11
Engineering	68	--
Business	--	28
Liberal arts	--	10
Other	--	11
No degree	--	40
	100	100
Supervisory level		
Individual contributor	76	64
Group/Unit/Section Head	15	18
Branch, Ass't. Branch Head	7	10
Division, Ass't. Division Chief	2	8
	100	100

The Question of Bias

Are the answers biased? Probably yes, although the degree of bias does not seem excessive. Two checks were made to determine the amount of bias:

1. A check was made to determine if those who responded supplied reasonably reliable answers. This was done by comparing the frequency of library copy service indicated by respondents (see Question 28, appendix A) with recent statistics on copies provided to all patrons. Assuming that the respondents are a representative sample, then the comparison of respondents' estimates to the actual number of copies distributed indicates that respondents' estimates are 20 percent high. However, part of this bias is apparently a result of non-respondent bias (explained in the following paragraph) rather than inaccurate answers on the part of those who responded.

2. A second check was made by comparing the percentage return of questionnaires from various divisions with the theoretical response that would occur if the questionnaires were distributed in proportion to the professional research staff strength (as is highly probable with the random selection system utilized to draw the sample). Those divisions with particularly high or particularly low returns were checked to determine if they also had a particularly high or low indicated percentage of library users. If this were true, then non-respondent bias (e.g., library users tend to respond, non-users do not) would be indicated. It was noted that the project office personnel had both a low respondent percentage return (38 percent) and a low percentage of library users (42 percent). However,

personnel in all other divisions appeared to respond without regard to the degree of library usage. Since project office personnel represent less than 8 percent of the total professional research staff, it was concluded that their general lack of response would not unduly bias the results.

It does appear, therefore, that the data may have a bias in favor of the library. However, the bias does not appear to be of such a size as to significantly change the basic conclusions of the report.

SECTION III

THE LIBRARY IN COMPARISON WITH OTHER INFORMATION SOURCES

> "We believe that the means by which scientists and engineers acquire information are such that, in their view, their behavior gets the job done." Rosenbloom and Wolek

In this section of the report, the library is considered as a whole and analyzed as one part of the complex system of information sources used by engineers and scientists. The library is evaluated in two ways. First, data on information sources resulting from this survey are compared with similar data from a major study of information sources of scientists and engineers (see Section II). Second, data on frequency of utilization and perceived importance of various information sources are compared.

Also in this section there are comparisons of information source utilization among subgroups of Langley professionals divided according to degree level (bachelors versus advanced degrees), job task (research versus design and development), and length of service and divisional affiliation.

Comparison of Information Sources: Langley Versus Other Research Organizations

In their report, Technology, Information and Organization, Rosenbloom and Wolek (hereafter R and W) gathered data on about 650 scientists and engineers who were employed at central research laboratories of four large corporations. The present survey at Langley gathered data using the same questions with the same instructions as used in the R and W study (see Questions 11-14 and related instructions in Questionnaire, appendix A). In these questions, respondents were asked to recall and give details of a

recent instance in which they found a technical idea or item of information, from a source outside their immediate work group, which proved useful in their work.

A comparison of information source utilization by Langley engineers and scientists with that from the R and W study is presented in table III-1.

TABLE III-1.- SOURCES OF USEFUL INFORMATION: LANGLEY RESEARCH PROFESSIONALS COMPARED WITH PROFESSIONALS IN CENTRAL RESEARCH LABS OF FOUR MAJOR CORPORATIONS

Information source	Percent	
	Langley N = 272	R and W N = 653
Written media:		
Outside professional literature (books, journals, reports by other organizations)	42	39
Inside professional - in-house reports	8	6
Trade - catalogs, trade publications, technical trade literature	8	10
Total written	58	55
Oral media:		
In-house - with members of own organization	25	28
External - with employees of other organizations	17	17
Total oral	42	45

Comparison of the two indicates that Langley research professionals find slightly more useful information in professional literature than do

similar professionals queried in the R and W report. It should be noted that both these media are the stock in trade of the library. These data can be taken as one piece of evidence that the library is an excellent one because it has changed the normal pattern of information uses utilized. Gerstberger and Allen (1968, p. 279) have demonstrated that accessibility and perceived technical quality are the criteria by which research and development personnel decide to use a particular channel. Thus, the fact that Langley research professionals use the professional literature more than R and W research professionals indicates that the professional literature at Langley is more accessible and/or is of higher technical quality than it was for the R and W professionals. Making professional literature of high quality accessible to users is, of course, the library's reason for existence. It would be erroneous to assume that the library provided 50 percent (of the sum of the two professional literature categories) of all useful information. The library was, however, involved in the process often.

The Langley survey asked (but, unfortunately, R and W did not) what role, if any, was played by the LRC library in the particular incident in which a useful item of information was found (see Question 15). The responses are shown in table III-2.

TABLE III-2.- ROLE OF LRC LIBRARY IN SUPPLYING USEFUL INFORMATION TO RESEARCH PROFESSIONALS

Role of library	Percent*
Library personnel provided lead or found information	6
A lead was found in an abstract, book, report, or article which respondent had obtained from the library	8
Substance of information was found in book, report, or article which respondent had obtained from the library	8
Substance of information, or a lead was found in document which someone other than respondent had obtained from the library	7
Library was involved in more than one of the above ways	5
	34

*Based on 272 responses.

Of the 272 instances, the library was involved in 94, either providing a lead, or finding the information, or providing a document in which a lead or the information itself was found. Thus, the library was involved, in one way or another, in 35 percent of the reported incidents of a respondent's finding useful information outside his immediate work group. That is exceptionally high for any single information source and demonstrates the major role played by the LRC library in supplying useful information.

Comparisons of Subgroups Within NASA and Corporate Samples

As pointed out earlier in Section II, information source utilization varies as a function of education (advanced degree holders use written sources more), job task requirement (research tasks require use of more written sources than do development and design tasks). For this reason,

it was decided to divide the respondents into several subgroups and compare the results with similar data from the R and W study. By this procedure, it was felt that it would be possible to control some of these variables which influence information source utilization and, by making additional comparisons, give the data a chance to either reinforce or contradict the tentative conclusion reached that the LRC library has, through its excellence, changed the normal pattern of information source utilization.

One of these comparisons of research professionals divided by job task is presented in table III-3. It should be noted that criteria for dividing respondents between research task and design/development task were substantially the same in both studies.

TABLE III-3.- SOURCES OF USEFUL INFORMATION: COMPARISONS OF LANGLEY AND CORPORATE PROFESSIONALS DIVIDED BY JOB TASK

Job task	Information source	Percent	
		Langley N = 125	R and W N = 211
Research task	Written media:		
	Outside professional	46	44
	In-house professional	10	5
	Trade	4	8
		60	57
	Oral media:		
	In-house	19	21
	Outsider	21	22
		40	43
		N = 89	N = 263
Development or design task	Written media:		
	Outside professional	33	33
	In-house professional	7	6
	Trade	13	11
		53	50
	Oral media:		
	In-house	24	36
	Outsider	23	14
		47	50

Data show that the professional literature is more widely used by NASA research professionals than by other professionals located at central research laboratories engaged in similar tasks. The difference is only 1 percent when comparing those engaged in development/design tasks, but is 7 percent when comparing those involved in research tasks.

One further comparison between Langley research professionals and those in central research laboratories is possible. In this case the two samples are subdivided according to degree level. This comparison is shown in table III-4.

TABLE III-4.- SOURCES OF USEFUL INFORMATION: COMPARISON OF LANGLEY AND CORPORATE PROFESSIONALS DIVIDED BY DEGREE LEVEL

Education	Information source	Percent	
		Langley	R and W
		N = 98	N = 457
Advanced degree	Written media:		
	Outside professional	56	42
	In-house professional	9	6
	Trade	6	7
		71	55
	Oral media:		
	In-house	12	26
	Outside	17	19
		29	45
		N = 174	N = 194
Bachelor's degree	Written media:		
	Outside professional	34	33
	In-house professional	8	7
	Trade	9	16
		51	56
	Oral media:		
	In-house	24	32
	Outside	25	12
		49	44

The most striking difference occurs when comparing Langley research professionals with advanced degrees with similarly educated professionals from the R and W study. Including both in-house and outside professional literature, the Langley group uses professional literature in 65 percent of the incidents, whereas the corporate professionals use it in only 48 percent of the reported incidents. While the comparison of sources of useful information between personnel with bachelor's degrees does not result in differences as large as those demonstrated by those with advanced degrees, once again Langley professionals are using the type of literature that the library deals in to a greater extent than other research professionals.

There are other background factors or characteristics which were found to make a difference in information sources utilized by research professionals in the R and W study. It was found that scientists (as opposed to engineers) and those with less than 10 years' service (as opposed to those with more than 10 years' service) made greater use of the written and, particularly, professional literature sources of information.[1]

On both counts, the comparisons of Langley and the R and W data from the central research division should have indicated lower usage of written sources since the Langley staff is composed of more engineers (68 percent versus 26 percent) and more 10-year-plus employees (48 percent versus 30 percent) than the R and W sample of central research laboratory

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[1]These findings were based on R and W's total sample of over 1,500 which included scientists and engineers from operating divisions as well as the central research laboratories. For this reason, the data are not presented and compared with data from NASA.

personnel. Thus, the differences shown by Langley professionals in use of the library-supplied sources are even more impressive.

If one accepts the premise that engineers and scientists use information sources on the basis of their accessibility and their quality, then it seems a reasonable inference that the LRC library is doing an excellent job of making quality information sources highly accessible.

Information Sources - Importance and Frequency of Use

Questions 16 and 17 asked respondents to indicate the frequency with which they used various information sources and the degree of importance of each source to their work. In answering the importance question, respondents were asked to indicate the degree of importance by selecting one of five answers ranging from Very Low to Very High. The answers were scored as follows: Very Low = 0, Low = 1, Moderate = 2, High = 3, Very High = 4. The average importance ratings as well as the percentage indicating monthly or more frequent usage are shown in table III-5.

The data indicate that the library ranks third in terms of importance and fifth in terms of utilization frequency.[2] The data indicate that the library plays a major role in fulfilling information needs. The only sources it does not surpass in importance are those more or less unavoidable sources which have a clear accessibility advantage over the library.

The importance ratings of several sources are low, as shown in table III-5. It should be noted that the average ratings include frequent

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[2]The data are not strictly comparable with those of the critical incident data presented earlier. The critical incident instructions asked respondents to exclude instances when the information came from someone in the immediate work group or from documents routinely used in everyday work.

users, infrequent users, and non-users of each service. For this reason the low importance rankings are not felt to be significant.

TABLE III-5.- UTILIZATION FREQUENCY AND PERCEIVED IMPORTANCE OF INFORMATION SOURCES BY LANGLEY RESEARCH PROFESSIONALS

Information source	Percent indicating use monthly or more often	Average importance rating
Own or colleague's personal library or files	89	3.0
Informal discussions with members of own work group	90	2.9
LRC library	55	2.5
Informal discussions with other NASA employees	70	2.4
Personally conducted experimentation	43	2.4
Documents/reports routinely distributed to my work group	78	2.8
Peers in my field in other organizations	22	1.9
NASA meetings, seminars, presentations of papers	20	1.7
Catalogs and documents supplied by vendors and contractors	50	1.7
Vendor/contractor personnel	35	1.7
Conventions/professional meetings, trade shows, symposia, etc.	4	1.2
Paid university/industry consultants	9	1.0
Other libraries	7	0.9

Information Sources - Administrative Professionals

The sample of professional-level administrative personnel answered questions similar to those of the research personnel on importance and frequency of utilization of various information sources. The question was changed slightly by deleting "personally conducted experimentation" and adding "policy or procedure manuals, regulations, codes, etc." (See Questions 7 and 8, appendix B.) The results are summarized in table III-6 in the same manner as were data from the research professionals.

The data clearly show that the library occupies a considerably lower position vis-a-vis other information sources for administrative professionals than it does for research professionals. The library ranks ninth in importance and tenth in utilization frequency. The results are not surprising in view of the fact that the library is designed primarily to meet the needs of the research professionals. The data do demonstrate the fact that different jobs have different sets of information needs and therefore result in different patterns of information source utilization.

TABLE III-6.- UTILIZATION FREQUENCY AND PERCEIVED IMPORTANCE OF INFORMATION SOURCES BY ADMINISTRATIVE PROFESSIONALS

Information source	Percent indicating use monthly or more often	Average importance rating
Policy or procedure manuals, regulations, codes, etc.	76	3.4
Informal discussion with own work group	86	2.9
Other NASA employees	76	2.7
Reports and publications routinely distributed to my work group	88	2.4
Own or colleague's personal library or files	64	2.3
Peers in my field in other organizations	45	2.2
NASA meetings and seminars	29	2.1
Vendor/contractor personnel	47	1.8
Books, periodicals, or documents from LRC library	28	1.5
Conventions, professional meetings, trade shows, etc.	10	1.5
Catalogs and documents supplied by vendors or contractors	35	1.3
Other libraries	14	1.2
Paid university/industry consultants	2	1.0

Comparative Library Utilization

If it is true that different jobs have different sets of information demands, then perhaps it would be of interest to examine library utilization by various subgroups within the total sample. The percent of library users (i.e., those indicating use of the library more than six times in the last 12 months) is shown in table III-7.

TABLE III-7.- PERCENT OF VARIOUS SUBGROUPS CLASSIFIED AS LIBRARY USERS

	Number	Percent users
All research respondents	319	73
All administrative respondents	49	23
Research respondents		
Managers	76	69
Non-managers[1]	241	75
Less than 10 years at Langley	164	77
More than 10 years at Langley	155	70
Bachelor's degrees	207	63
Advanced degrees	111	92
Research task	125	89
Design/development task	89	44
Engineer	200	72
Scientist	93	74
Analysis and Computation Division (ACD)	23	26
Research divisions (excluding ACD)	224	86
Engineering and technical services	34	32
Project offices	12	42

[1]Sum of managers and non-managers does not equal total number of respondents (319) because a few respondents did not indicate their supervisory level. For similar reasons, other groupings may not add to 319.

Several points deserve comment. The very high utilization percentages demonstrated by research professionals with advanced degrees indicates the importance of experience in using a library. These individuals undoubtedly have had more experience with libraries and therefore tend to use it more. In addition, they are more likely to be engaged in research tasks as opposed to design/development tasks where they would have greater need to refer to the professional literature.

The data by division are also interesting. It is not too surprising that the research divisions have a high percentage of library users. The low percentage utilization for the Analysis and Computation Division, the engineering and technical service divisions, and the project offices would appear to indicate that the information needs of their jobs are substantially different. Wolek (1969, p. 472) points out that the information needs of project personnel become more and more narrow as the design of their project becomes "frozen." He suggests that it may be dysfunctional for project personnel to continue their information search: "It becomes more and more important that the engineer not be diverted to new technological concepts or possibilities."

Why Non-Users Are Non-Users

All individuals indicating that they did not use the library more than six times in the preceding 12 months were asked to comment on why they did not use the library more frequently (see Question 23). The results of the responses to this question by the 84 non-users are summarized in table III-8.

TABLE III-8.- NON-USERS' REASONS FOR NON-USE OF LIBRARY*

Response	Percent
Information needs of my job	
a. Are better or more easily fulfilled from other sources	50
b. Are sufficiently fulfilled by branch or personal library	6
c. Just doesn't require use of library	10
I used the library more in the past but	
a. My job has changed (typically to management or project office)	12
b. I quit because of microfilm reading problems or books always being out	3
c. I've been on educational/military leave	4
The library does not fulfill my information needs because	
a. The collection does not contain information on the topics relevant to my job	3
b. The material I need is beyond state of the art and is thereby not yet in print	5
Other	
a. Too busy	3
b. Library too far away	4

*Based on responses from 84 respondents.

Th responses clearly indicate that their reasons for non-use are mostly cases of non-need rather than any shortcoming on the part of the library collection or the services offered.

This finding confirms the earlier analysis of data presented on library use by divisions and by job task, which suggested that job task is a major determinant of information needs and, therefore, of information sources utilized.

It would seem reasonable to conclude that the library is used by all, or almost all, of those having information needs which can be met by the library.

SECTION IV

EVALUATION OF LIBRARY COLLECTIONS, SERVICES, PERSONNEL, TOOLS, AND FACILITIES

This portion of the report summarizes and analyzes the responses of the respondents categorized as users. Question 22 (see Questionnaire, appendix A) asked if the respondent had used the library services, including both visits to the library and telephone or written requests for services, more than six times in the last 12 months. Those who answered yes (231 or 73 percent of those responding) were asked to complete a series of questions (Questions 24 - 35), relating to the library collections, services, and facilities. The results reported in this part of the report are, with a few exceptions, a summary of responses made by those library users.

The Collection

Respondents were asked how often they used various portions of the total collection (Question 24). Their responses are summarized in table IV-1 which gives the percentage of respondents indicating use weekly or more often, and those indicating use monthly or more often. It can be seen that the paper copy collection of documents and reports are most frequently used, followed by periodicals and microfiche documents.

TABLE IV-1.- UTILIZATION AND USEFULNESS RATING OF VARIOUS PORTIONS OF LIBRARY COLLECTION

Collection	Percent reporting use		Usefulness rating
	Weekly or more often	Monthly or more often	
Paper copy collection of reports	31	55	2.75
Periodicals (current and bound)	22	48	2.30
Microfiche reports	20	49	1.79
Books	19	42	2.33
Classified documents	7	17	1.30

Question 25 asked users to rank the various portions of the collection with respect to the usefulness to their work by selecting one of five choices as follows: Very Low, Low, Moderate, High, Very High. Responses were scored by assigning numerical values to each response with a Very Low = 0, Low = 1, Moderate = 2, High = 3, and Very High = 4. The average usefulness rating of each portion of the collection is also shown in table IV-1.

It is noteworthy that the microfiche collection ranks third in utilization and fourth in usefulness in view of its size vis-a-vis other portions of the collection. The microfiche collection is larger than the paper copy collection of documents, yet ranks below it in utilization frequency and well below it in usefulness.

The low utilization frequency of classified documents is not surprising in view of the "need to know" criteria. Since the average usefulness rating

includes ratings of many respondents who simply do not utilize classified documents, its low value is not felt to be significant.

Question 26 asked respondents to name a particular field or fields in which the library collection has made a significant contribution to your work because of its strength or depth. A total of 150 responses were received to this question (some respondents contributed more than one). The answers were classified in various categories. The results of this classification are shown in table IV-2.

TABLE IV-2.- FIELDS IN WHICH USERS INDICATE LIBRARY HAS SIGNIFICANTLY HELPED WORK

Field	Number of responses
Aircraft and aerodynamics	30
Fluid mechanics, gas dynamics	29
Mathematics, statistics, computers	20
Materials and structures	14
Heat transfer	11
Chemistry	10
Physics (acoustics, cryogenics, geophysics)	10
Space flight/orbital mechanics	6
Other (ranging from pyrotechnics to electron microscopes)	20

Question 27 asked users if there were any particular fields in which the library collection would, if strengthened, noticeably help their work. A total of 47 responses were received (some respondents contributed more than one).

TABLE IV-3.- FIELD IN WHICH RESPONDENTS INDICATE THEIR WORK WOULD BE NOTICEABLY HELPED IF LIBRARY COLLECTION WAS IMPROVED

Field	Number of responses
Mathematics, statistics, computers	7
Aircraft, aerodynamics	5
Physics	5
Chemistry	4
Instrumentation	4
Management, psychology	4
Biology	3
Other, unclassifiable	15
	47

Respondents indicate about three times as many fields in which they have been helped by the collection as they indicate fields that would help if strengthened. Many of those responding to Question 27 repeated their answer given in Question 26. They were saying that the collection had helped them, but that further strength would help them more.

Five respondents used this question to suggest the collection could be improved if more back issues of journals and more books (specifically textbooks) were added.

There were several opportunities for users to make comments on the library in general (Question 35) or to relate difficulties they had experienced utilizing the library (Question 30) or to suggest improvements (Questions 31 and 32). Only four of some 160 responses to the "difficulty" question pertained to the collection. The difficulties resulted from reports not being available. A few (7 of 200) responses to the general comments question pertained to the collection. All but one indicated the collection was adequate to very good. A few suggested improvements pertained to the collection. These all suggested expansion of the periodical collection, primarily through the acquisition of back issues of journals.

The low level of responses to all these questions indicates that the collection is adequately fulfilling the information needs of research professionals. Now, let us examine the situation for the administrative professionals.

Response from Administrative Professionals

The results from the questionnaire sent to the administrative professionals did not inquire about usage of particular portions of the collections since it was felt that most of these personnel are infrequent users of the library. However, administrative professionals were asked the same questions about fields in which the library had helped their work or would help if the collection was strengthened. From the 49 respondents, 10 fields were indicated in which the library had helped. Twenty-one responses were obtained on the "stronger collections would help" question. The results are summarized in table IV-4.

TABLE IV-4.- FIELDS WHICH ADMINISTRATIVE PERSONNEL INDICATE LIBRARY COLLECTIONS HAVE HELPED OR COULD HELP THEIR WORK

Field	Have made a contribution	Would help if strengthened
Mathematics, statistics, computers	4	2
Management	1	10
Cost accounting, pricing	-	3
Other, miscellaneous	5	6
	10	21

Note that the ratio of "have made a contribution" responses to the "stronger collections would help" responses is about 1:2 in the case of administrative professionals. This is in sharp contrast to the 3:1 ratio observed among research professionals.

Library Tools and Facilities

In this section, survey data will be presented on the frequency of utilization and importance ratings of various library tools and facilities. Following this comparison of all the tools and facilities, additional survey data are presented for individual facilities where appropriate.

Users were asked the frequency with which they utilized various library tools and facilities in Question 28. They were also asked to indicate the degree of importance to their work of each (Question 29). The degree of importance ratings were scored as before (i.e., Very Low = 0, Low = 1, Moderate = 2, and Very High = 4). Frequency of utilization responses are summarized in table IV-5.

TABLE IV-5.- UTILIZATION AND IMPORTANCE RATINGS OF LIBRARY TOOLS AND FACILITIES

Tool/facility	Percent reporting use		Average importance rating
	Monthly or more often	Few times/yr or more often	
Abstracting services (STAR, IAA, etc.)	57	86	2.30
KWIC-combined index printout	7	37	0.80
Card catalog (books)	19	81	1.74
Card catalog (pre-1962 documents)	11	60	1.73
Microfilm reader	17	65	1.12
RECON	1	33	0.86

The one tool that stands out in both utilization frequency and importance is the abstracting services. This is not surprising in view of the wide circulation of these publications at Langley.

The low usage of the microfilm reader is somewhat surprising. It may be that respondents interpreted this question to mean use of a reader at the library. If so, the low utilization is not surprising.

The remaining tools are ones which users must come to the library to use. Since most users do not visit frequently (but rather call or send a note), the low frequency of utilization and low importance ratings are not surprising. Furthermore, the user (as we shall see later) makes use of library personnel to find the information he seeks rather than use of the tools himself. The personnel are more accessible and a lot more pleasant to deal with.

Evaluation of Individual Library Tools

Abstract/Announcement Publications - One of the principal ways in which patrons find out what is new in particular fields is through announcement services. Four such services announce for the entire NASA system. The services are as follows:

Scientific and Technical Aerospace Reports (STAR)

International Aerospace Abstracts (IAA)

Classified Scientific and Technical Aerospace Reports (CSTAR)

Selected Current Aerospace Notices (SCAN)

The first three of the above are abstract services covering (1) reports (STAR), (2) books, journals, conference papers (IAA), and (3) classified reports (CSTAR). The fourth is an announcement service only designed for selective dissemination to individuals by topic.

All respondents were asked about their use of or familiarity with the four announcement services. This is an exception to the general practice followed in Section IV of reporting on responses of those individuals who are classified as library users. The data are summarized in table IV-6.

TABLE IV-6.- ALL RESPONDENTS FAMILIARITY WITH AND USE OF NASA ANNOUNCEMENT SERVICES

Service	Percentage		
	Have used	Not used but heard of	Never heard of
STAR	77	11	12
CSTAR	54	20	26
IAA	54	17	29
SCAN	25	24	51

The responses indicate that the services are widely used. Somewhat surprising, however, is the relatively low use and recognition of SCAN. Less than half of all the respondents have heard of it, and only half of those use it. In view of the fact that three-fourths of the respondents have used STAR, and over half have used CSTAR and IAA, it may well be that SCAN is redundant in that it covers the same reports and publications as do the older and more established abstract services.

There were several open-ended questions in the questionnaire which asked users to comment on many difficulties they had had using the library (Question 30), improvements they would suggest (Questions 31 and 32).

Question 35 asked for any comments of any nature they had about the library. Only three out of some 160 responses to the "difficulties" question pertained to abstracts or announcement services, thus indicating that these services are one of the stronger parts of the total information system. The few complaints made were that the abstracts were vague and, in some cases, misleading, in that authors used new nomenclature to try to make some old findings appear new. Suggested improvements were to have more skilled personnel doing the abstracting.

The wide usage of and the general lack of difficulty reported lead to the conclusion that the abstracting/announcement services are fulfilling their function well.

Microfiche - The survey clearly reveals a widespread and strong dislike for microfiche. In an open-ended question, "difficulties in utilizing the library," 79 of the 161 comments (or 49 percent) pertained to microfiche,

readers, or copies made from microfiche. No other category received more than 15 percent of the total difficulty responses. A few comments of respondents follow:

Respondent 8: "Have to search building for microfilm reader, carry it up or down a couple of flights of stairs; it takes up a large area on the desk, is awkward to use and hard on the eyes."

Respondent 30: "I hate microfilms and will use them only as a last resort."

Respondent 134: "Microfilm reports seem to get thrown in a drawer for future perusal, then do not get read."

Respondent 22: ". . . tend to put off looking at it."

Respondent 251: "How is one supposed to refer from text to tables using one of those readers?"

Respondent 56: "Microfilm enlargements are sometimes unreadable and always curl up . . ."

It is obvious that the opportunities for frustration are numerous in using microfiche. Once film is obtained, there may be a problem in (1) reader accessibility, (2) illegible original document and, consequently, illegible film, (3) poor quality reproduction on film, (4) awkwardness in using reader, particularly in referring from text to tables, (5) poor quality reader (or reader out of adjustment), and (6) inability to get legible paper copy of material found to require extensive study.

There is no question that the quality of readers and reproducing equipment has improved in recent years. However, it is equally clear that the problems associated with the use of microfiche have not been solved. This is not a local complaint about a local issue. Robert B. Thrall, a prominent scholar and past editor of Management Science rejects the use of microfilm: "With microfiche the entire contents of a journal can be

recorded on film the size of an index card. However, there is as yet no generally satisfactory reading device." (1970, p. B-580.) Were difficulties in utilizing microfiche only an inconvenience, it would not be of great concern. But as several of the above comments by respondents indicate, it is not only an inconvenience, but it is a deterrent.

RECON - The earlier data (table IV-5) indicated relatively little usage of RECON, the remote console which provides access to the computer stored index of reports and publications at College Park. In view of the low usage (only 1 percent indicate monthly or more frequent usage), it is somewhat surprising that 8, or 5 percent, of the responses to the "difficulty" question pertain to RECON. Of these complaints, four were that RECON was too slow and three pertained to RECON's not working (i.e., down) when needed.

The author is, by virtue of his limited observations and experiences, in agreement with those reporting difficulties. Of the two terminals at the library, only one was operable at any time during June and July in spite of one visit by a service engineer. The remaining terminal was frequently inoperable because the central computer at College Park was down. Even when operating, delays of 1 minute were frequent before the computer would accept an instruction. Perhaps this writer has been oversold on computer capability by advocates to whom a nanosecond is a long time. However, for a system that is a major part of such a massive information retrieval system, RECON seems unnecessarily unreliable and slow.

Library Services

The discussion of library services and personnel follows the pattern used before, namely, presentation of data on utilization frequency and

important rankings of all the services, followed by further analysis of individual services. Responses to Questions 28 and 29 which inquired into utilization and importance of library services are presented in table IV-7.

TABLE IV-7.- UTILIZATION AND IMPORTANCE RATINGS OF LIBRARY SERVICES

Service	Percent reporting use		Average importance rating
	Monthly or more often	Few times/yr or more often	
Help by library personnel in locating specific book or report	42	97	2.70
Literature searching by library personnel to find information for which I had no specific lead	10	82	2.38
Help by library personnel in use of "finding tools"	10	80	2.05
Copy service	47	97	2.62
Checkout service	61	99	2.75

Note that "help by library personnel in finding a specific report or book" is used monthly by 42 percent of the users, and several times per year by nearly all (97 percent). Comparison of these data with that on utilization of the finding tools (table IV-5) (KWIC index, card catalog, etc.) indicates that most users rely much more heavily on the library staff rather than doing it themselves.[1] Confirming this conclusion are the importance ratings. The importance rating for reference service is 2.70, while that of the finding tools ranges from 0.80 to 1.74[1] (see table IV-5).

[1]With the exception of using the abstracts which probably are used more as an announcement service than as a finding tool.

Literature searching by library personnel was used by 10 percent of the library users monthly and by 80 percent occasionally. The high importance rating of 2.38 given this service is phenomenal, considering the relatively low frequency of use (caused apparently by lack of supply rather than lack of demand). For example, the widely used (57 percent report monthly or more frequent use) abstracting services received an importance rating of 2.30, somewhat less than the literature search service for which only 10 percent report usage monthly or more often.

Copy service and checkout service are both very heavily used. Nearly half of the respondents reported monthly or more frequent requests for copies, while over 60 percent check something out monthly or more often. Virtually all (97 percent and 99 percent, respectively) use these services at least several times a year, which indicates that circulation (which includes copy give-aways) is the high-volume library operation. In terms of importance ratings, each of the circulation services rank essentially equal with reference services.

With respect to all library services, the "difficulties" question resulted in a relatively low number associated with library services. Of these, the largest number were associated, as one would predict, with the most heavily used service, circulation. The difficulties reported which pertain to library service are summarized in table IV-8.

It should be noted that almost half of those who reported difficulties associated with slow copy service noted that the slow delivery was associated with requests for documents not available locally and had to be ordered from

the "Facility." The difficulty for these respondents (and perhaps for others who were not so specific) result from system design, not its operation.

TABLE IV-8.- REPORTED DIFFICULTIES ASSOCIATED WITH LIBRARY SERVICES

Difficulty	Number of times reported
Reference:	
Help not readily available	3
Couldn't find report requested	1
	4
Literature search:	
Not readily available	2
Provided too much information	2
	4
Circulation:	
Slow copy service	13
Book charged erroneously	1
No follow-up on documents ordered from facility	2
Documents not available locally not ordered promptly	1
	17

Considering the relatively low level of difficulties reported pertaining to library services (25, or 15 percent, of total "difficulty" responses), it can be concluded that respondents find services adequate to meet their needs. However, the responses also indicate that the staff is being pushed to handle all the demands placed on them by a larger collection and a greater number of patrons.

Accessibility/Information About Library

Throughout the preceding discussion, reference has often been made to Question 30 which asked users if they had experienced any difficulty in using the library. There were a number of responses to this question which do not neatly fit into the pattern of organization adopted for this section. Almost all of these responses can be grouped under the broad heading of accessibility. This includes accessibility to the collection itself, accessibility to finding tools, and difficulties posed by lack of knowledge of what the library has to offer.

TABLE IV-9.- REPORTED DIFFICULTIES ASSOCIATED WITH ACCESSIBILITY

Difficulty	Number of times reported
Books are checked out by others	10
Individuals having book are slow to return when requested	2
Books I have are requested by others	1
Periodicals missing from shelves or otherwise difficult to locate	4
NASA reports not accessible	2
Book collection split (Dewey/LC)	1
Finding tools are inaccessible, difficult to use, or incomplete	8
Do not know how to use library or what it has to offer	8
	36

These responses indicate some degree of difficulty by users. The frustrations caused when others have books out or periodicals have been sent to the bindery are perhaps unavoidable. However, responses in the last two categories above indicate that some users cannot get at or do not know how to use library finding tools or do not know what is available.

Overall Impressions

A great deal of Section IV has dealt with problems or difficulties reported in utilizing the library. Respondents reported difficulties because they were specifically asked to do so. They were not asked to report their successes or their favorable opinions. The questionnaire was not designed to elicit compliments. Thus, it is impressive that most users did comment favorably in response to Question 35 which was "Do you have any comments about the library, its collection, services, facilities, personnel, etc.?" A total of 197 responses (some respondents contributed more than one) were received. They are summarized in table IV-10.

TABLE IV-10.- CONTENT ANALYSIS OF RESPONSES TO GENERAL COMMENTS QUESTION

General nature of response	Number of times reported
Personnel competent, friendly, cooperative, helpful, efficient	96
Library, in general, is best, outstanding, essential, excellent	43
Library services are excellent, complete, satisfactory, adequate, timely	21
Library collection is adequate, good	6
Total negative comments	31
	197

The negative comments appeared to be roughly distributed in the same proportion as in Question 30, which inquired about difficulties. No new issues were raised.

Although the proportion of favorable to unfavorable comments is impressive, it cannot capture the real flavor of the appreciation, gratitude, and compliments expressed by the users. A few of the respondents' comments may help.

Respondent 47: "Would be lost without it."

Respondent 226: "Most of my trips to the library would end in frustration were it not for the excellent service rendered by the staff. These people should be commended for the excellent service they render."

Respondent 56: ". . . do an excellent job generally, in light of limited resources."

Respondent 76: "Better than could be expected."

Respondent 88: "Nothing but ridiculously good service."

Respondent 55: "They do a wonderful job with what they have to work with . . . research would be impossible without their generous cooperation."

Respondent 54: "In my thinking, the library is the most complete facility, the most cooperative workers, and offers the best services available anywhere."

And finally, from a respondent whose questionnaire came too late to be included in most of the analysis: "I think a special point should be made of the apparent interest that library employees have in helping us solve our problem. This is pleasantly at variance to the frequently encountered position that a job entails discharge of certain minimal responsibilities. Their attitude is refreshing."

SECTION V

CONCLUSIONS AND RECOMMENDATIONS

> "It's not enough to design a system that can be used. A system has to be designed which will motivate people to use it." William E. Moffett

The major conclusion of this report is that the LRC library plays a vital and important role in supplying Langley research professionals with technical and scientific information. This is evidenced by the comparison of sources of useful information of Langley scientists and engineers with those of similar personnel in the research divisions of several large corporations. Langley professionals with similar-type jobs use the type of literature furnished by the library more than do comparable professionals in other organizations. Further reinforcement of this conclusion is found in the high frequency of usage and the high importance rankings of the library shown by the survey of research professionals. Analysis of use by job type and division further indicates that all, or nearly all, of the engineers and scientists having jobs with information needs that can be met with written published documents are utilizing the library. In short, the library plays a major role in providing essential information to its users, who are numerous.

In the remaining portion of the report, the author will discuss some of the findings with an emphasis on improvements which should be made. While this approach is critical in some areas, it should be emphasized that the overwhelming weight of evidence and observation leads inevitably to the conclusion that the library is an outstanding one.

Size Versus Accessibility

If, as Gerstberger and Allen (1968, p. 279) have shown, perceived accessibility is the primary criteria by which information sources are selected, then making information accessible is as important as collecting it, if not more important.

What this means to the library, or any organization which would serve as a source of information, is that a small, highly accessible collection may provide more information to the user than a large, relatively inaccessible collection. This is not a recommendation to reduce the size of the collection. Rather, its purpose is to make the point that there is a trade-off between the size of a collection and the accessibility to that collection.

The second major conclusion of this report is that resources have been far more readily committed to increasing the size of the collection than to increasing its accessibility. This has resulted in an imbalance - a magnificent collection with some deterrents to its use because of accessibility.

Accessibility is where the problems are. Almost all the difficulties experienced by respondents pertain to accessibility. That is what complaints on microfiche, slow copy service, reference help not being available, books are checked out by someone else, etc., are all about. There are several other ways in which the data reinforce this point.

A vivid example of the effect of accessibility is seen in the utilization frequency reports in different form. About 120,000 reports are available locally in paper copy, while about 240,000 are available only on microfiche. Respondents to this survey have strongly indicated that

information on microfiche is not as accessible as information on paper. Respondents indicated that they used the paper copy report collection more often and it was more useful than the microfiche collection. Circulation figures bear this out. Paper copy report circulation averages 1,700 per month, while microfiche averages 1,100. Each paper copy document gets roughly three times the circulation of each microfiche document. Furthermore, if we are to believe what many respondents say about microfilm, much of it gets filed for future reading and stays filed.

It is certainly true that the local collection of reports includes many which are done locally or done on contract for LRC. Therefore, one would expect somewhat higher utilization frequency of the local collection because of higher interest. However, it seems doubtful to this writer that local reports have that great an interest advantage over other reports.

Another example of the importance of accessibility can be found in the changes in patterns of circulation that have occurred since 1964. Recall that while book circulation has remained roughly constant, periodical circulation has grown dramatically from 13 to 33 percent of the total. During the same 6-year period, the report circulation has dropped from 77 percent of the total to 56 percent.

It is clear that accessibility has increased for periodicals and decreased for reports during this period as can be seen in the following:

1. Few periodicals were cataloged prior to the step to centralize cataloging in College Park. Since that time, articles selected for abstracting by IAA are included in the master index. This places these selected

articles in the KWIC index and on RECON in addition to announcing them in the widely distributed IAA abstract series.

2. Most of the articles abstracted (and therefore included in the system) are available in the library.

3. Xerox has become more available in recent years.

4. Reports, while announced in STAR and included in the indices and RECON, have gained little over their earlier accessibility since they were cataloged at LRC.

5. Only one-third of the reports are available on paper copy. The remainder are on microfiche. Formerly, almost all reports were available locally in paper copy form.

6. Paper copy from microfiche is (1) less legible than Xerox, (2) not available approximately half the time because the machine which produces paper copy from microfiche is not operable, and (3) requires section head approval to obtain.

Once again, it appears that accessibility is a more important variable than size in determining use of information.

Recommendations

Since accessibility is so highly important, the recommendations which follow are directed toward improving accessibility. The reader should not lose sight of the fact that the high use made of the library indicates that its services are generally accessible - certainly more so than the average library. The recommendations which follow are aimed at improving an already generally high level of accessibility. Recommendations are divided into three major categories as follows:

1. Facility related - pertain to service rendered by College Park Facility.

2. Internal changes at LRC library.

3. Support required for continued excellence.

The major factors reducing the accessibility of reports are the myriad of problems associated with the use of microfiche.

In view of the fact that microfiche reports simply are not utilized, because of their form, serious investigation of alternate systems should be undertaken. While detailed feasibility analysis is beyond the scope of this report, several ideas should be investigated such as the following:

Obtain one printed copy of each report rather than microfilm. Xerox copies of the original as needed. There are several variations that should be explored such as relying on film for all reports over 5 years old in order to minimize storage problems. Another alternate would be to rely largely on film, but order an original for all reports demanded one or more times in the first year after announcement in STAR. In this way the patrons select the most important items which can then be made available in more accessible form for future use.

Another possibility is to get completely out of the film business, utilizing facsimile transmission from the facility for any report requested. This equipment may be too slow and/or expensive for the volume involved. It may be possible to utilize RECON transmission lines for the facsimile transmission during off hours to provide an overnight service. An even simpler approach is to offer the user a choice of microfilm today or a Xerox from the facility in 2 days to 5 days.

If none of the above proves practical, then the minimum the facility should undertake is (1) to obtain from the author or type from copy the author supplies a legible copy of every document which is announced in STAR, (2) institute a quality control program on film reproduction. To announce and abstract a report for which a legible copy is not available converts an information retrieval service into a frustration retrieval service. Frustrated users tend to become non-users.

Langley Library

There are numerous areas in which the library can improve the accessibility of its collection as follows:

Microfiche: If a viable alternate to use of microfiche cannot be found and the facility does not improve quality of the film, then the library should institute its own quality control program. Poor quality film should be returned to the facility.

If film is sent to patrons, a printed note should be attached that says something like "if you find after examination that this report is of significance and you need to study it in detail, please request a hard copy." It appears that a great number of users do not understand that hard copy can be made available. The requirement for section head approval should be dropped.

The library should continue its investigation of better reproducing equipment and pressure the manufacturer of the present equipment for better maintenance, leading to a higher service factor and better reproduction.

Finding Tools: The library needs to improve its finding tools and make them more accessible to users. Many patrons will not use them, but some would rather "do it themselves." To the extent that patrons serve themselves, the limited library staff can devote to providing better service for those who request it. The following suggestions are made to accomplish this aim:

1. The card catalog for books should be completed by adding the missing subject entries.

2. The card catalog for pre-1963 reports should be made accessible. This would require removing classified material.

3. A current index of periodicals should be provided in the reading room.

4. The KWIC indices should be made accessible to patrons. If legible films of these indices can be provided and some projection device found which will reproduce a quality image, such a system should be promoted.[1]

Collections: The library collection should be made more accessible by the following steps:

Placing a due date on items checked out. It is estimated that the average book checked out stays out for 40 months. It seems to this writer that either the patrons are (1) utilizing the book regularly in their work, in which case they should purchase the book through their division, or (2) only keeping the book because of possible future usefulness. In

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[1]There is no real contradiction in suggesting the use of film. The present form and voluminous size of these indices make them difficult to use. A quality film-based system could make them more accessible. The same is not true of a typical report.

this case, the book should be returned to the library so that others might be able to use it. It would seem that a 6-month period, with a 6-month renewal option, would be a reasonable compromise between the present policy and the relatively short loan allowed by many libraries.

The library collection would be more accessible if all the books were classified under the Library of Congress system rather than the present split system in which the books are divided between a Dewey Classification and the Library of Congress Classification.

The Patrons

The point was made early in this report that the library of 1970 was quite different in terms of size, information form, finding tools, etc., from the library of a decade ago. Yet there is no way for the relatively infrequent user or the non-user to know that. It also seems likely that many of the frequent users are not fully aware of the collections and services that are available. The library has been too modest. It should advertise. The following is a partial list of ideas which might be used to increase patron awareness.

A users guide which describes the collections, the tools, and the services available. Give-away copies could be placed at the reference desk and in the reading room by the elevator and sent to new employees.

A "reacquaintance tour" in which a division or branch is invited to the library, given a brief tour, a cup of coffee, and a 5-minute talk describing the not-so-visible services and collections that are available.

A series of short articles in the Langley Researcher describing individual services offered by the library.

Directions for patrons in the form of signs or labels pointing out that (1) recent past issues of periodicals are available and they may be obtained by . . ., (2) this card catalog contains only references to books, (3) the books are divided into two sections: Dewey, covering books purchased before 1965; and Library of Congress, covering all later purchases.

Support Needed for Continued Excellence

It is probably true that members of the library staff have, at one time or another, made all the recommendations that this report makes, along with some better recommendations.

However, because of reduced budgets, manpower reductions, and the extreme difficulty of measuring the value of a library's services, the library has found itself in a very low-priority situation. As a result it has made the best of split systems, tools of low utility, and reduced staff in the face of the data explosion and an increased number of patrons. One often cited example is the cataloging system. In place of a locally compiled card catalog, a master tape of reports was made available from the facility. Using this tape and locally written computer programs, it is possible to obtain indices of the system-wide collection of reports and articles by author, subject, or citation number. The system suffers a major disadvantage vis-a-vis a card catalog in that it cannot be easily updated by adding new cards. The program must be re-run and new index produced. Because of a shortage of computer time, the library's primary reference tool is often not current and is always split into four or five sections according to the date of initial citation. Thus, the librarian must look in four or five places instead of one. That takes longer.

In that and in many ways, the "new" library requires more time and more skill on the part of its staff. Many of the difficulties experienced by survey respondents reflect the strain placed on the staff and the services they render in a larger library with less than adequate support. Continued lack of support will be reflected in reduced accessibility of information to Langley professionals.

Quo Vadis

It is undoubtedly true that the data explosion will continue. This will place additional strains on the library in future years. There appear to be no good solutions to the problems created by the data explosion. Ideally, a more critical screening process for getting reports or articles into the system would reduce the total volume of information and make it more manageable. However, such a step would require, literally, an army of highly trained and skilled judges.

Schemes to discard data after a certain time period may have some merit. However, the high use of the pre-1963 card catalog of reports indicated in the survey and the numerous requests for back issues of journals (as far back as the turn of the century, in fact) indicate that such a procedure would frustrate many patrons.

Several ideas which may be of value in helping to cope with the continuing deluge of data follow:

1. Rely more on periodical literature. This would follow the trend of utilization by patrons in recent years. Periodicals, at least those with editorial boards, do some screening for quality, uniqueness, and relevance.

2. Make use of gatekeepers. Perhaps the library of the future will concentrate on really supplying a great deal of service to relatively few people and rely on the "gatekeeper," who is naturally inclined to do so anyway, to serve as a conduit to others. Both Hall (1969, p. 11) and Allen (1969, p. 18) suggest this approach.

3. Increased aid in searching for information. One of the most highly rated services of the library is the literature search service. It would seem that this service would become even more useful in the future, particularly if searchers can sort the wheat from the chaff as well as locating articles and reports. In this instance, the literature searcher becomes a form of gatekeeper, operating in the library instead of the research division.

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APPENDIX A

LANGLEY RESEARCH CENTER

Memorandum

TO :

DATE: July 7, 1970

FROM : Assistant Director for Administration

SUBJECT: Participation in Technical Information/Library Utilization Survey

The attached questionnaire inquires into the way in which professional employees at Langley Research Center find and use technical information. It is concerned in particular with the role played by the LRC Technical Library in fulfilling information needs. The questionnaire is part of a study being conducted by Dr. H. D. Dewhirst who is at LRC on the Summer NASA-ASEE Research Fellowship Program.

The purpose of the study is to provide a better understanding of the use of various technical information channels and to evaluate the performance of the LRC Library in providing useful information services.

You may identify yourself although there is no requirement that you do so. No attempt will be made to identify individuals who do not choose to identify themselves. The questionnaire results will be processed by Dr. Dewhirst, analyzed, and reported only in aggregate statistical terms.

Your cooperation in completing and returning the questionnaire promptly to Dr. Dewhirst at Mail Stop 109 will be appreciated.

T. Melvin Butler
M/S 111 2741

Enclosure

TECHNICAL INFORMATION/LIBRARY SURVEY

Your help is needed in a research project. The purpose of this project is to learn more about the way in which various sources of technical information, particularly, the Langley Research Center Technical Library, are utilized by LRC professional employees. You are asked to help by giving 15-20 minutes of your time to complete the following questions.

INSTRUCTIONS - Remember that your first reaction to a question is generally the best. If a multiple choice question does not offer a choice which precisely describes your situation or belief, select the choice which comes the closest. Except where otherwise noted, please check only one answer for each question.

Where appropriate, more detailed instructions are given for particular questions. Please read these instructions carefully.

PART I - Background questions

1. Age:

_____ 20-24
_____ 25-29
_____ 30-34
_____ 35-39
_____ 40-49
_____ 50+

2. Employed by Langley:

_____ less than 1 year
_____ 1-2 years
_____ 3-5 years
_____ 6-10 years
_____ 11-15 years
_____ 15-20 years
_____ 20+ years

3. Education (Check highest level attained):

_____ High school
_____ Bachelor's degree
_____ Working toward Master's degree
_____ Master's degree
_____ Working toward Doctor's degree
_____ Doctor's degree

4. Academic discipline of most recent degree (e.g. - Mechanical Engineering):

_____

5. Supervisory level:

_____ Individual contributor
_____ Unit, group, or section head
_____ Branch/Ass't Branch Head
_____ Division/Ass't Division Chief

6. Technical or scientific society meetings attended during the last year:

_____ none
_____ one
_____ two
_____ three
_____ four or more

7. Conference papers, articles, books or NASA formal series reports published in previous five years:

_____ none
_____ one
_____ two
_____ three
_____ four or more

8. U.S. Patent applications filed in the past five years:

_____ none
_____ one
_____ two
_____ three
_____ four or more

9. Division or Office (e.g. - AMPD, VPO) _____ _____

10. My work can best be described as: (select the one description which is most appropriate for your primary function. However, if several descriptions are equally appropriate, check more than one):

_____ Non-technical support activities
_____ Formulation, programing or testing of approaches to data processing problems
_____ Formulation or testing of scientific theories or concepts
_____ Empirical scientific investigation of physical phenomena
_____ Formulation, development and investigation of new approaches to materials, equipment or procedures problems
_____ Combination and integration of generally available designs and components into desired equipment, processes and test procedures
_____ Refinement of existing equipment, processes or test procedures
_____ Analysis or testing of materials, equipment or procedures
_____ Fabrication of physical models or equipment
_____ Other, specify _____
_____

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PART II

INSTRUCTIONS - The following questions ask you to describe the most recent instance in which a technical idea or item of information, which you obtained from a source outside your immediate circle of colleagues, proved to be useful in your work. Technical information is meant to include a wide variety of information (i.e. - theories, concepts, ideas, specifications, data, procedures, etc.) that is technical or scientific in nature. Information on job assignments, budgets, or work schedules is meant to be excluded.

The specification of "source outside your immediate circle of colleagues" is meant to limit your answer to instances in which the substance of the information came from someone who was not a member of the same basic formal unit of organization of which you are a member. By this we mean to exclude the small group of colleagues reporting directly to the same supervisor, or, if you are in a supervisory position, the group whose work you supervise directly. If the substance of the information came from an outside source to which you had been referred by a person within your immediate group of colleagues, you should include the instance.

In this same vein, you should exclude items of information which you obtained from documents which are routinely used in your everyday work (i.e., the handbooks, catalogs, and specification folders which you habitually use). Information obtained from such documents should be included when the instance of their use fell outside the context of established routine.

"Most recent" should be interpreted strictly. If you are debating whether to report a minor item you learned of this morning or to refer instead to some earthshaking discovery made yesterday, please describe this morning's example.

11. Today's date is _____

The date on which this instance occurred was _____

12. I first encountered the substance (actual data, theory, concepts, or methods) of this information:

ORALLY IN

_____ an informal face-to-face conversation
_____ a telephone call
_____ a prearranged meeting, conference, or seminar

IN WRITTEN FORM IN

_____ a published book
_____ a published technical or scientific journal or conference reprint
_____ a published trade magazine
_____ an NASA report or document
_____ a report issued by another organization
_____ supplier catalogs or technical trade literature
_____ a document not listed above (please describe)

_____

_____

13. My informant or the principal author(s) of the document which contain the substance of the information was (were):

_____ an NASA employee
_____ a sales representative
_____ an engineer or scientist in private industry (other than sales representative)
_____ some other employee from private industry
_____ a university employee
_____ an employee of another government agency
_____ employed in an unknown way

INSTRUCTIONS - If you first obtained a lead to the information acquired in this instance rather than the substance of the information itself, please answer question 14. If you directly obtained the information itself, skip question 14 and proceed to question 15.

14. I first obtained the lead to this information from:

ORALLY FROM	IN WRITTEN FORM IN
_____ an NASA employee	_____ an NASA report
_____ a sales representative	_____ a bibliographical or abstract publication
_____ an engineer or scientist in another organization (other than a sales representative	_____ a published book, technical or scientific journal or conference preprint
	_____ a published trade publication
_____ a person not described above (please describe) _____	_____ a report issued by another organization
_____	
_____	
_____	

15. The role played by the LRC Technical Library in this instance was (check more than one if appropriate):

_____ library personnel provided lead
_____ library personnel found substance of information
_____ I found lead in abstract or bibliography provided by library
_____ I found lead in other book or document which I obtained from the library
_____ I found the substance of information in book or other document which I obtained from the library
_____ I found a lead in a book or document which someone else obtained from library
_____ I found the substance of information in book or other document which someone else obtained from the library
_____ The library was not involved in any of the ways described above

PART III

Listed below are numerous possible sources of technical information which you may, or may not utilize in your work. Two distinct questions are asked about each source.

16. Please check the frequency category below which best describes your utilization for each information source.

17. Please indicate the degree of importance to you in accomplishing your work of each information source.

Daily	Weekly	Monthly	Few times a year	Never		Degree of importance: Very low	Low	Moderate	High	Very High
___	___	___	___	___	Own or colleague's personal library or files	___	___	___	___	___
___	___	___	___	___	Reports and documents routinely distributed to my work group	___	___	___	___	___
___	___	___	___	___	Catalogs and documents supplied by vendors or contractors	___	___	___	___	___
___	___	___	___	___	Books, periodicals or documents from LRC library	___	___	___	___	___
___	___	___	___	___	Books, etc. from other libraries	___	___	___	___	___
___	___	___	___	___	NASA meetings, seminars, and presentations of papers	___	___	___	___	___
___	___	___	___	___	Informal discussion with members of own work group	___	___	___	___	___
___	___	___	___	___	Other NASA employees	___	___	___	___	___
___	___	___	___	___	Vendor/contractor personnel	___	___	___	___	___
___	___	___	___	___	Peers in my field in other organizations	___	___	___	___	___
___	___	___	___	___	Conventions, professional meetings, trade shows, symposia, etc.	___	___	___	___	___
___	___	___	___	___	Personally conducted experimentation	___	___	___	___	___
___	___	___	___	___	Paid university or industrial consultants	___	___	___	___	___

18. How many hours would you estimate you spend both at work and elsewhere in a typical week reading scientific and technical books, journals, reports, documents, and trade publications:

_____ none
_____ less than 2 hours
_____ 2-5 hours
_____ 5-10 hours
_____ 10-15 hours
_____ 15+ hours

19. With how many different people outside your immediate work group do you discuss work related problems during a typical week:

_____ none
_____ one
_____ two
_____ three
_____ four or more

20. With respect to providing technical information, data, and advice on technical problems to others, most of my colleagues:

_____ Enthusiastically offer information without being asked
_____ Will cheerfully provide information if asked
_____ Are somewhat reluctant about sharing information
_____ Provide information grudgingly
_____ Avoid providing information

PART IV - Library and Library Services

21. Have you heard of or used any of the following:

	Have Heard Of	Have Used
STAR (Scientific and Technical Aerospace Reports)	_____	_____
CSTAR (Classified Scientific and Technical Aerospace Reports)	_____	_____
IAA (International Aerospace Abstracts)	_____	_____
SCAN (Selected Current Aerospace Notices)	_____	_____

22. Have you used library services, including both visits to library and telephone or written requests for service, more than 6 times in the last 12 months:

_____ Yes _____ No

INSTRUCTIONS - If you answered Yes to question 22, please skip question 23, and proceed to question 24.
If you answered No to question 22, please answer question 23, and then read the instructions below.

23. I do not use the library more frequently because:

_____ The information needs of my job are met more easily or better by other sources

_____ The information needs of my job are not met by the library (please describe your needs)

_____

_____

_____

_____

_____ I have in the past used the library more than I do now. I use it less now because _____

_____

_____

_____

_____

_____ Other reasons (please specify) _____

_____

_____

_____

INSTRUCTIONS - If you answered No to question 22 and have completed question 23, you may skip the remaining questions which are specifically concerned with the library collection and library services.

Thank you very much. Your cooperation is appreciated. Sign your name below, if you so desire.

_____

TO RETURN QUESTIONNAIRE, FIRST REMOVE COVER MEMO, THEN PLACE IN LRC MAIL

Listed below are several different portions of the total library collection.

24. Please indicate the approximate frequency with which you use each portion.

25. Please indicate the usefulness of each portion to your work.

Daily	Weekly	Monthly	Few times a year	Never		Very Low	Low	Moderate	High	Very High
____	____	____	____	____	Books	____	____	____	____	____
____	____	____	____	____	Periodicals (current and bound)	____	____	____	____	____
____	____	____	____	____	Microfilmed documents and reports	____	____	____	____	____
____	____	____	____	____	Paper copy collection of documents and reports	____	____	____	____	____
____	____	____	____	____	Classified documents	____	____	____	____	____

26. Is there any particular field or fields (e.g., gas dynamics, Bayesian statistics) in which the library collection has made a significant contribution to your work because of its strength and/or depth.

_____

_____

_____

27. Is there any particular field or fields in which the library collection would, if strengthened, noticeably help you in your work?

_____

_____

_____

Listed below are a group of library services, tools, and facilities. Two distinct questions are asked about each.

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28. Please indicate the approximate frequency with which you use each.

29. Please indicate degree of importance to your work of each.

Daily	Weekly	Monthly	Few times a year	Never		Very Low	Low	Moderate	High	Very High
					LIBRARY SERVICES:					
___	___	___	___	___	Help by library personnel in locating a specific book, document, etc. for which I had a lead (i.e., title, author, or report number)	___	___	___	___	___
___	___	___	___	___	Literature searching by library personnel to find information for which I had no specific lead	___	___	___	___	___
___	___	___	___	___	Help by library personnel in my use of "finding" tools (e.g., card catalog, KWIC/Combined Index Printouts)	___	___	___	___	___
___	___	___	___	___	Copy service (i.e., Xerox of article or paper copy from microfilm)	___	___	___	___	___
___	___	___	___	___	Check out service (books, documents, microfilm)	___	___	___	___	___
					LIBRARY TOOLS AND FACILITIES:					
___	___	___	___	___	Abstracting services (e.g., STAR, IAA)	___	___	___	___	___
___	___	___	___	___	KWIC/Combined Index Printout	___	___	___	___	___
___	___	___	___	___	Card Catalog (Books)	___	___	___	___	___
___	___	___	___	___	Card Catalog (Pre-1962 documents)	___	___	___	___	___
___	___	___	___	___	Microfilm reader	___	___	___	___	___
___	___	___	___	___	RECON (remote console) computer based information retrieval system	___	___	___	___	___

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30. Please describe the nature of any difficulties you have experienced in utilizing any of the above services, tools, or facilities:

_____
_____
_____
_____

31. What steps would you recommend to prevent the difficulties described in question 30 from reoccurring?

_____
_____
_____
_____

32. What particular service, tool, or facility would, if improved, expanded or instituted, significantly help in your work?

_____
_____
_____
_____

33. With respect to timeliness, the library usually provides the requested service or furnishes the requested information:

_____ Promptly or ahead of time required
_____ In time to be useful
_____ Slowly enough to reduce its usefulness
_____ Too late to be useful

34. Do you perform a sort of sub-library type service by giving or loaning materials you have gotten from the library to your colleagues?

_____ Frequently
_____ Occasionally
_____ Never

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35. Do you have any comments about the library, its collection, services, facilities, personnel, etc.?

_____

_____

_____

_____

Thank you very much for your cooperation. It is sincerely appreciated. Sign your name below if you so desire.

_____

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A few respondents will be selected for short (maximum 10 minute) interviews on sources of technical information and how they are utilized. If you would be willing to participate in such an interview, please furnish your telephone extension below.

NASA Phone _____

TO RETURN QUESTIONNAIRE, FIRST REMOVE COVER MEMO, THEN PLACE IN LRC MAIL

APPENDIX B

INFORMATION SOURCES/LIBRARY SURVEY

Your help is needed in a research project. The purpose of this project is to learn more about the way in which various sources of information, particularly, the Langley Research Center Technical Library, are utilized by LRC professional employees. While the Library's primary role is in fulfilling information needs of engineers and scientists, some broadening of the collection has occurred in recent years. This questionnaire is designed specifically for non-technical professionals to determine the degree to which the Library is providing, or could provide, useful services.

INSTRUCTIONS - Remember that your first reaction to a question is generally the best. If a multiple choice question does not offer a choice which precisely describes your situation or belief, select the choice which comes the closest. Except where otherwise noted, please check only one answer for each question.

Where appropriate, more detailed instructions are given for particular questions. Please read these instructions carefully.

PART I - Background questions

1. Age:

_____ 20-24
_____ 25-29
_____ 30-34
_____ 35-39
_____ 40-49
_____ 50+

2. Employed by Langley:

_____ less than 1 year
_____ 1-2 years
_____ 3-5 years
_____ 6-10 years
_____ 11-15 years
_____ 15-20 years
_____ 20+ years

3. Supervisory level:

_____ Individual contributor
_____ Unit, group, or section head
_____ Branch/Ass't Branch Head
_____ Division/Ass't Division Chief

4. Education (Check highest level attained):

_____ High school
_____ Bachelor's degree
_____ Master's degree
_____ Doctor's degree

5. Academic discipline of most recent degree (e.g. - Business Administration)

_____

6. Division: (e.g. - TIUD, PERS)

_____

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Listed below are numerous possible sources of information which you may, or may not, utilize in your work. Two distinct questions are asked about each source. Remember that information includes both information sought for a specific job task and information used to maintain current awareness of what is new in your particular field.

7. Please check the frequency category below which best describes your utilization for each information source.

8. Please indicate the degree of importance to you in accomplishing your work of each information source.

Daily	Weekly	Monthly	Few times a year	Never		Degree of importance: Very Low	Low	Moderate	High	Very High
—	—	—	—	—	Policy or procedure manuals, regulations, codes, etc.	—	—	—	—	—
—	—	—	—	—	Own or colleague's personal library or files	—	—	—	—	—
—	—	—	—	—	Reports and publications routinely distributed to my work group	—	—	—	—	—
—	—	—	—	—	Catalogs and documents supplied by vendors or contractors	—	—	—	—	—
—	—	—	—	—	Books, periodicals, or documents from LRC Library	—	—	—	—	—
—	—	—	—	—	Books, etc., from other libraries	—	—	—	—	—
—	—	—	—	—	NASA meetings and seminars	—	—	—	—	—
—	—	—	—	—	Informal discussion with members of own work group	—	—	—	—	—
—	—	—	—	—	Other NASA employees	—	—	—	—	—
—	—	—	—	—	Vendor/contractor personnel	—	—	—	—	—
—	—	—	—	—	Peers in my field in other organizations	—	—	—	—	—
—	—	—	—	—	Conventions, professional meetings, trade shows, etc.	—	—	—	—	—
—	—	—	—	—	Paid university or industrial consultants	—	—	—	—	—

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9. How many hours would you estimate you spend both at work and elsewhere in a typical week reading books, journals, published reports, and trade publications pertaining to your work:

_____ None
_____ Less than 2 hours
_____ 2-5 hours
_____ 5-10 hours
_____ 10+ hours

10. With how many different people outside your immediate work group do you discuss work-related problems during a typical week:

_____ None
_____ One
_____ Two
_____ Three
_____ Four or more

11. Have you used library services, <u>including both visits to library and telephone or written requests for service</u>, more than 6 times in the last 12 months:

_____ Yes _____ No

<u>INSTRUCTIONS</u> - <u>If you answered Yes</u> to question 11, please skip question 12 and proceed to question 13.

---

12. I do not use the library more frequently because:

_____ The information needs of my job are met more easily or better by other sources
_____ The information needs of my job are not met by the library (please describe your needs)

_____
_____
_____
_____

_____ Other reasons (please specify)_____
_____
_____
_____

13. Is there any particular field or fields (e.g., Bayesian statistics, Employee incentive systems, Cost accounting) in which the library collection has made a contribution to your work?

_____

_____

_____

14. Is there any particular field or fields in which the library collection would, if strengthened, help you in your work?

_____

_____

_____

15. Please describe the nature of any difficulties you have experienced in utilizing the library.

_____

_____

_____

16. What steps would you recommend to prevent the difficulties described in question 15 from recurring?

_____

_____

_____

17. With respect to timeliness, the library usually provides the requested service or furnished the requested information:

_____ No opinion
_____ Promptly or ahead of time required
_____ In time to be useful
_____ Slowly enough to reduce its usefulness
_____ Too late to be useful

18. Do you have any comments about the library, its collection, services, facilities, personnel, etc.?

_____

_____

_____

Thank you very much for your cooperation. It is sincerely appreciated. Sign your name below if you so desire.

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_____

NASA-Langley, 1970

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